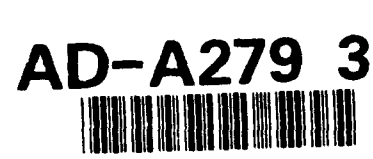

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Bomber Force 2000: Operational Concepts for Long-Range Combat Aircraft

by

Jeffrey K. Beene

Major, USAF

A paper submitted to the Faculty of the Naval War College in partial satisfaction of the requirements of the Department of Joint Military Operations.

The contents of this paper reflect my own personal views and are not necessarily endorsed by the Naval War College or the Department of the Navy.

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This research paper seeks to synthesize analyses of air power theory and doctrine, historical insights from major operations, current thinking, and the emerging strategic environment to detail concepts for improved planning and execution of future air operations. These operations would fully integrate bombers as long-range combat aviation assets. The search for a type of aircraft to fit the doctrine derived from early interpretations of air power theory has hindered development of bomber potential. The use of atomic weapons at the end of World War II and the ensuing Cold War further obscured understanding of bombers--their real contribution hinging on viewing them as long-range combat aircraft. Today, the bomber is not obsolete, but its traditional nuclear paradigm is. The emergence of regional threats combined with a shrinking defense establishment and

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the global compression of time and space demand full integration of bomber aircraft into the US air power arsenal. These aircraft provide a theater commander with a unique capability to rapidly respond across the spectrum of conflict from a peacetime show of force to major nuclear or non-nuclear conflict. However, for the operational commander to employ bomber assets effectively requires a full recognition of bomber attributes and a thorough understanding of their capabilities.

Abstract of
BOMBER FORCE 2000: OPERATIONAL CONCEPTS FOR LONG-RANGE COMBAT AIRCRAFT

This research paper seeks to synthesize analyses of air power theory and doctrine, historical insights from major operations, current thinking, and the emerging strategic environment to detail concepts for improved planning and execution of future air operations. These operations would fully integrate bombers as long-range combat aviation assets. The search for a type of aircraft to fit the doctrine derived from early interpretations of air power theory has hindered development of bomber potential. The use of atomic weapons at the end of World War II and the ensuing Cold War further obscured understanding of bombers--their real contribution hinging on viewing them as long-range combat aircraft. Today, the bomber is not obsolete, but its traditional nuclear paradigm is. The emergence of regional threats combined with a shrinking defense establishment and the global compression of time and space demand full integration of bomber aircraft into the US air power arsenal. These aircraft provide a theater commander with a unique capability to rapidly respond across the spectrum of conflict from a peacetime show of force to major nuclear or non-nuclear conflict. However, for the operational commander to employ bomber assets effectively requires a full recognition of bomber attributes and a thorough understanding of their capabilities.

PREFACE

I undertook this project in an attempt to prove my long-held notion that the bomber force has been one of the least understood and most under-utilized parts of the US Air Force. My first assignment in the B-52H at Minot AFB, North Dakota included the additional mission tasking of the Strategic Projection Force --an autonomous conventional bomber force tasked for rapid response to crisis events in Southwest Asia. I quickly came to appreciate the massive firepower that bombers, equipped with conventional weapons, can deliver and the damage they are capable of inflicting on a variety of targets. I also experienced the frustration of watching this capability continually take, what I believed was, an unnecessary back seat to the strategic nuclear mission. I do not say this because I believe the nuclear deterrent mission was wrong. Indeed, I am convinced that the bomber's role in deterrence is real. I simply believe the bomber, when thought of as a long-range combat aircraft, has more to offer the Nation and its theater commanders.

Although current Air Force doctrine and recent organization changes are leading the bomber force in a direction I feel is appropriate, I wanted to look at history, theory, current thinking, and the emerging strategic environment to determine if these efforts are well-founded and valid. I wanted to see if there was a useful military life beyond the nuclear triad for the US bomber force.

I want to gratefully acknowledge the guidance and advice of Lt. Col. Kermit V. Boschert, USAF, in helping me prepare this operations research paper.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF ILLUSTRATIONS

BOMBER FORCE 2000: OPERATIONAL CONCEPTS FOR LONG-RANGE COMBAT AIRCRAFT

CHAPTER I

INTRODUCTION

The Problem. The Cold War was the central focus of our national military strategy for over forty years. The efforts to avoid a global nuclear confrontation with the Soviet Union was key to the strategy. It required a great deal of human and capital investment in "strategic forces"--bombers[1], missiles, and submarines--specially designed to fight a war that was to be avoided at all costs. Although nuclear threats are still very real, the Cold War as we knew it is over. New military threats to the security of the United States are emerging and will continue to exist. How we realize the potential military value of all our forces in an era of fiscal restraint is at the forefront of policy considerations for our national military strategy in the search for a viable ends, ways, and means match. Bombers have historically been thought of as a nuclear weapon system best capable of providing direct linkage to strategic objectives. Is there a sound basis to believe that bomber aircraft fit into operations beyond strategic nuclear deterrence?

Scope. Bomber aircraft are the scope of this paper because of their unique combined characteristics of extended range and payload. These characteristics produce versatility in air warfare not available to smaller combat aircraft types, such as fighter and attack aircraft.

Provisions. This paper will not address costs or the particulars of force structure and organization. All references to such will use present and

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[1] The term "bomber" as used throughout this paper refers to the class of aircraft that by virtue of its inherent range and payload capability can project combat power (deliver weapons) to those portions of a theater unable to be reached by other combat aircraft. When the term is used in a present and future sense, the inherent range of the bomber without refueling is intercontinental.

programmed bomber conventional capabilities.

This paper will not address bomber nuclear capabilities other than to highlight their overall impact on the lack of bomber utilization or draw comparisons where operational concepts are similar. The nuclear capabilities of bombers are well-documented and will be assumed to be familiar to the reader.

Conclusions. Air power theory, current Air Force doctrine, emerging technologies, and the new global strategic situation have combined to produce a new paradigm for the US bomber force. When thought of as long-range combat aircraft, bombers can provide theater commanders-in-chief (CINCs) with a unique ability to tailor and employ their forces for a variety of operations capable of achieving strategic and operational objectives across the spectrum of conflict.

CHAPTER II

SIGNIFICANT HISTORY OF BOMBER OPERATIONS

> Victory smiles upon those who anticipate the changes in the character of war, not upon those who wait to adapt themselves after the changes occur.[1]
>
> Major General Giulio Douhet

This is not intended to be a history lesson. Certain events provide important background for tracing the operational employment of bombers. These events provide a case study of retrospective analysis and a prospective foundation for future decisions.

Early Influences. When the US entered World War I there were notions of air power, but no coherent formulation of doctrine.[2] These notions highlighted the struggle between those--primarily airmen--who advocated independent forces and the preponderance of ground officers who saw air forces as strictly army auxiliaries. For the earliest theorists--Douhet, Mitchell, Trenchard--World War I provided the framework for their ideas and the first attempts at formalizing air power doctrine.

Major General William "Billy" Mitchell and Air Marshal Sir Hugh M. Trenchard led major World War I air efforts of note. At St. Mihiel and the Meuse-Argonne, Mitchell, serving as a unified air commander, succeeded in integrating a mixed force of bombers and pursuit aircraft with the overall ground operations plan. These battles were significant because they demonstrated two fundamental principles which Mitchell would expound on: concentration of force and the priority of counterair action.[3] However, what is most important from an operational standpoint is: 1) he used bombers in a complementary role with other aircraft and 2) he organized air power efforts in support of the commander's objectives.

When the Royal Air Force (RAF) was created in 1918, Trenchard became commander of a separate and independent force within the RAF established "for direct action against the heart of the German industrial system."[4] Trenchard saw air force independence and bomber capabilities as the basis for air power. In independent air operations on some 50 cities he sought to reduce German military production and undermine civilian morale.[5] It is operationally significant that he directed air attacks at what he saw as the sources of enemy strength as opposed to its manifestations.[6]

Another air commander of World War I was Italian Major General Giulio Douhet. While his air power theory will be dealt with in detail later in Chapter V, it is important here to note his impact, along with Mitchell and Trenchard, on development of US air power doctrine that emerged before World War II. In short, Douhet believed the key to "command of the air," and ultimately victory, was to overwhelm the enemy by bomber offensives directed at centers of air power, production, and communication.[7] The Air Corps Tactical School (ACTS) founded at Maxwell Field, Alabama in 1926 would draw heavily from the experience and writings of these men.

What emerged in the inter-war years at ACTS was a doctrine based on strategic bombardment reflecting the ideas of Trenchard and Douhet combined with Mitchell's organizational ideas for an independent air force. The doctrine espoused was one of: daylight, precision, high altitude, unescorted bombardment, operating independent of surface forces, and directed against the enemy's war-making capacity.[8] However, the technology required to do all these things was lagging. Not until the B-17 and the Norden bombsight became available in the late-1930s did the Air Corps believe it had an aircraft capable of performing to the doctrinal standard.

World War II. The US-British Combined Bomber Offensive (CBO) brought to light a mismatch between air power doctrine and bomber capability. Without fighter escort, bombers proved incapable of achieving air superiority by bombing the German Air Force. Bomber loss rates totaled almost ten percent during October 1943--a rate which would require a new bomber force almost every three months to sustain the offensive.[9] Independent bomber operations, for the sake of trying to establish the decisive impact of strategic air power, resulted in a dispute in the Army Air Corps over the effects achieved by the bombing. Was using bombers to lure out the Luftwaffe to be destroyed by US fighters a strategic use of air power? Additionally, the German infrastructure proved not to be as vulnerable to the bombing as envisioned--aircraft production actually doubled in 1943.[10] But was this simply caused by a failure to select the correct targets within the infrastructure?

All questions were either forgotten or answered in August 1945 over Hiroshima. The B-29 and a single atomic bomb seemingly proved the effectiveness of independent bomber operations. Mitchell, Trenchard, Douhet, and ACTS doctrine appeared vindicated, and then some: air power could destroy the enemy's means and will to continue to fight.

Korea: Strategic Bombing and Limited War. The war in Korea was a special case as far as air power lessons go. Our military leadership believed the initial North Korean invasion to be a feint, with the major attack expected to come from the Soviets in Europe. Strategic Air Command (SAC) B-29 bomber units were among the first to respond to Korea. Eventually, five bomb groups were organized as a bomber command under the Far East Air Force.[11] This arrangement, similar to a World War II bomber organization, again raised the question of whether the Air Force actually understood its doctrinal advocacy

of the indivisible application of air power. Strategic and tactical air operations became more associated with specific types of aircraft than with ways of using them. The destruction of all the targets termed "strategic" in Korea soon had bombers performing interdiction and close air support, roles typically relegated to fighter aircraft. However, SAC remained convinced its primary operations involved deterrence of the Soviet threat in Europe. World War II-era B-29 units were not upgraded with the new all-jet B-47 aircraft.[12] By the spring of 1951 almost all replacement crews for B-29 units in the Far East were recalled World War II reservists who would return to civilian life after the war.[13] These events alone suggested that SAC was not interested in learning anything about conventional operations for the future.

The Only Means Available. The 1950's were the heyday of SAC. Until the mid-1950's, bombers were the only means available to deliver atomic weapons. This erstwhile unique mission not only helped claim autonomy for the U.S. Air Force in 1947 (SAC was activated in 1946), but it established the bomber as a strategic weapon in its own right. 1953 Air Force doctrine states: "Air vehicles and new weapons have provided air forces with the ability to concentrate enormous decisive striking power upon selected targets on a global scale."[14] [Emphasis added.] SAC bombers provided the cornerstone of "massive retaliation." Bombing operations in any future limited wars and in support of ground forces became the province of Tactical Air Command (TAC) and Navy carrier aviation.[15] By the beginning of the 1960's ICBMs, SLBMs, and increased attention to conventional forces under "flexible response" threatened the bomber's reason for being.[16] Given the perceived nature of the Soviet threat, the Air Force continued to stress the bomber's existing "strategic nuclear" role under the "triad" at the expense of conventional

operations.

Vietnam: Another Side Road. The war in Vietnam soon found SAC bombers involved in operations other than those associated with its primary mission. B-52s were employed widely in interdiction and close air support roles, highlighting the bomber's inherent flexibility. However, the political success of Linebacker II, as a strategic attack to undermine the will of the North Vietnamese, again reinforced existing thinking of the traditional bomber role. Although Linebacker II was a joint and highly integrated conventional air power mission,[17] there was no overall air component commander who could optimize unity of command. SAC still operated the bombers in an autonomous fashion complicating command and control. After the war there even developed a perception, especially in SAC, that "bombers had won the war." A prevailing saying in SAC was: "Fighters are fun. Bombers make policy." The was no overwhelming need or desire to change anything with respect to meeting a potential future conventional tasking. However, eighty B-52Ds were retained in the post-war drawdown and assigned an additional responsibility for SAC's non-nuclear contingency plans.[18] Free-fall gravity bombs remained the only conventional weapons in the SAC inventory.

Falklands. Britain's conception of the role for it's bomber aircraft in the Cold War was essentially the same as that of the U.S. When the 1982 Falklands crisis with Argentina erupted it posed a number of problems for the British military. Foremost among them was how to quickly respond over the 7,000 nautical mile trip to the Falklands. Ascension Island, approximately 4,000 nautical miles northeast of the Falklands, was the only available forward air base, and there were no locally based aircraft to counter land and naval based aircraft from Argentina.[19] Vulcan "strategic" bomber units in Britain

underwent a rapid program to modify aircraft for conventional bombs and train aircrews. In the longest combat strikes ever made by bombers, up to that time[2] , the British demonstrated the potential of long-range air power employed from outside the theater of operations to influence a ...aign.[20]

Desert Storm. Between the end of the Vietnam War and 1990 some ...ajor changes had taken place in SAC's conventional war-fighting capability which will be addressed in detail in the next chapter. For purposes here, it is important to note that the stigma of a nuclear bomber as a weapon system of las resort was changing. The end of the Cold War altered a major planning assumption. The Soviet Union was dissolved and the threat of global nuclear war diminished. Some bombers could be used for conventional operations without adverse impact on nuclear war-fighting ability. In the Persian Gulf War, sixty-four B-52s flew an average of fifty sorties a day without degrading SAC's nuclear deterrent capability.[21] More importantly, the SAC Commander-in-Chief (CINCSAC), released operational control of the assets to U.S. Central Command. According to General George L. Butler, CINCSAC during Desert Storm, "That got us over a tremendous psychological hurdle because we recognized at that point that bombers can in fact be in one role or the other [conventional or nuclear] depending on the call of the President."[22] This facilitated U.S. bombers' first participation in an integrated air effort employed successfully under the auspices of a Joint Force Air Component Commander (JFACC). As in Korea and Vietnam, bombers were used in a limited war against a regional threat in roles other than strategic attack. Moreover, the simultaneous application of different types of aircraft across various air power roles,

---

[2] The longest combat missions ever conducted by bombers were flown round-trip by B-52s from Barksdale AFB, LA to the Iraqi theater in the 1991 Persian Gulf War. The round-trip distance was approximately 14,000 nautical miles.

made a strong case for the complementary nature of those roles and the need for indivisible application of air power.

Lessons of History. In retrospect, the bomber's use in air combat has been affected by the search for the ideal, or theoretical, application of decisive air power employed to win a war on its own. The advent of atomic and nuclear weapons, in an age of the only potential adversary who could destroy the US, continued to overshadow the inherent flexibility of the bomber--an air platform capable of many uses. Except for Cold War nuclear deterrence, bombers and their weapons were always out of step with the existing air power doctrine.

World War I provided enough of a glimpse of air power to enable several visionaries to theorize its potential. World War II bombers, while able to carry the fight to the enemy's heartland, did not have overall capabilities to meet expectations. Bombers could not fly undefended without a measure of air superiority. Actual weapon precision and effects did not produce the degree of lethality necessary to preclude a ground invasion of Europe, as originally hoped for by Air Corps planners. But, the atomic strikes in Japan seemingly brought theory, doctrine, and technology all together. The emergence of the post-World War II Soviet threat added validity to the air power concept that held the bomber as its centerpiece.

In 1950, the rapid response of SAC bombers was critical to South Korea's defense. Nine days after initial tasking, the first B-29s to arrive from the U.S. were flying combat missions, demonstrating the mobility and striking power of SAC.[23] For the remainder of the war, bombers were used in other traditional air power roles with good results. Yet, little was learned from air power in Korea that carried forward into the nuclear "new look" age.

Vietnam again demonstrated the need for massive aerial firepower to be available to the theater commander. The bomber again showed its versatility across a variety of roles but, the fact that air superiority was not a major contention in Korea or Vietnam masked potential lessons learned. Being able to fly over targets and employ World War II-era tactics and weapons was good enough as long as the US maintained air superiority.

The Falklands crisis and Desert Storm demonstrated the significance of the bomber's unique range capability and restated how the bomber's heavy firepower continues to be important in conventional operations. But, in Desert Storm air superiority was achieved early on, which again allowed World War II-era weapons and tactics to be used with success. However, both these conflicts clearly showed the impact of high-technology weapons on the lethality of modern war. This prompted General George L. Butler, CINCSAC (General Butler assumed command after Desert Shield.), to make the following assessment of SAC's performance in Desert Storm: "...if we had to do Persian Gulf six or seven years from now, and all SAC could do was come over with B-52s and drop banded high-drags [free-fall gravity bombs] from 40,000 feet, then we would not be invited to participate."[24]

Writing before the Gulf War, General John T. Chain, CINCSAC, formulated the following lessons of bomber history:[25]

1. The bomber's capacity to apply massive firepower accurately can play a crucial role in a conventional theater conflict.

2. The capacity stated above runs contrary to the traditionalist view of bomber air power.

3. Technological advances in air warfare increase the combat effectiveness of many types of weapon systems.

4. While technology is enhancing the multi-mission capability of bombers, war-fighting requirements are rendering it essential.

The Gulf War confirmed General Chain's analysis while providing a framework for the future.

CHAPTER III

BREAKING OLD MOLDS

> It is useless and frivolous to expect necessary aerial strategy to be evolved for us by men whose ideas are rigidly set in older molds.[26] [Emphasis in original.]
>
> Alexander P. De Seversky

Before Desert Storm some major changes in bomber operational employment concepts took place in a decade-long evolution (some might say revolution) in SAC. The Arab oil embargo and other events of the 1970's in the Middle East prompted a review of national security policy focusing on regional threats. The 1981 Defense Bill authorized and appropriated funds for a multi-role bomber and further solidified reasons for change.[27]

1980's: SAC Change of Command. Formation of the Strategic Projection Force (SPF) in 1980 created an entire employment concept around the use of B-52s in a conventional bombing role, including elements necessary to set up forward operating locations, as well as tanker and reconnaissance aircraft.[28] As was the case in Vietnam, SAC retained operational control of nuclear assets by making the SPF a separate part of the larger Rapid Deployment Force (RDF)--predecessor to US Central Command.[29] The theater CINC was put into a difficult position of being able to plan for the use of bomber assets that might not actually be available if the need arose. If the bombers were made available, the theater CINC would have to task them through SAC. Under this arrangement, the theater CINC could not achieve unity of command over all air assets.

Conventional bombing training continued in SAC, but took on increased emphasis and new direction under the leadership of two career fighter pilots: General Larry D. Welch and his successor General John T. Chain, Jr. This

change of command was significant because both men proved unafraid to investigate greater uses for bombers. Later, as Air Force Chief of Staff, General Welch continued as a strong proponent of expanded roles for bombers. One of General Chain's most important programs involved dual mission tasking which mandated all B-52 units to train in both nuclear and conventional operations.[30] Until this change, only those B-52 units that were specifically tasked to support theater CINCs trained in conventional operations.[31]

General Chain's underlying philosophy was that improved conventional capability also contributed to deterrence and was, therefore, a major portion of SAC's mission. As the tasked commander for bomber assets, he sought to provide the theater CINCs with a fully capable conventional bomber force. In 1987 remarks before the Senate Committee on Appropriations Defense Subcommittee, General Chain stated, "To enhance SAC's near-term conventional capability to meet increasing theater requirements, I have directed all bomb wings to immediately achieve the capability to conduct conventional as well as nuclear operations."[32] Changes along these lines continued. In 1988 the Single Integrated Operational Plan (SIOP), or nuclear mission, for the first time released sixty-one B-52Gs for the sole purpose of conventional operations; helping to sever the traditional link between bombers and nuclear weapons.[33] Relinquishing operational control and emphasizing missions beyond the range of fighters were among the ideas further developed to more extensively support theater CINCs under General Chain's Strategic Area of Responsibility concept.[34] Despite these changes, old habits proved hard to break. Mighty Warrior 89, a NATO exercise against a simulated Soviet-style threat, still employed bomber forces independent of the tactical air

forces.[35]

Reorganization. When the Air Force restructured in 1992, its major commands were realigned to include functionally organized numbered air forces. Bombers joined fighters in the new Air Combat Command (ACC). Within that major command, long-range combat aircraft, bombers and F-111s, were assigned to Eighth Air Force. B-52s, and eventually B-1Bs, were also assigned to a new composite "air intervention" wing which includes multi-role fighter aircraft. The primary advantage of this new organization being in grouping the aircraft by mission--conventional and nuclear versus strategic and tactical--and thereby enhancing overall effectiveness. Furthermore, the bombers' conventional capability will be unencumbered by nuclear treaty restraints. The B-2 is secure as a multi-role bomber, while the 1992 Washington Summit Agreement removes any restraints prohibitin the B-1B from being tasked primarily as a conventional war-fighting platform.[36] Efforts are underway to improve integration as well. In 1993, B-1s deployed to Korea for Exercise Team Spirit. This exercise highlighted the results of ACC's improvement efforts to operate bombers in a joint and combined environment while demonstrating the diminishing stigma of the "nuclear" bomber. The ability to deploy to new forward locations, such as Korea, should improve future prospective basing rights without lessening the impact of the presence of our large combat aircraft. In this case, the exercising of a composite force of B-1s and fighters demonstrated to North Korea just how diverse and deadly U.S. conventional air power has become.[37]

Current B-1 and B-52G/H Capabilities. Throughout its life, the B-52 has made a strong statement about the inherent flexibility of an airframe. Its capabilities today, having been most recently demonstrated in Desert Storm,

are formidable. While both the B-1 and B-52 can readily be employed at night, the B-52 has limited weather penetration capability. With its terrain-following radar, the B-1 enjoys the advantage of excellent penetration capability in adverse weather and/or at night. While the range of each of these bombers varies with its method of employment, all have intercontinental reach without refueling. With one refueling and simultaneous employment from the CONUS, Diego Garcia, and Guam each of the bombers could reasonably cover the globe. Representative ranges for each in a high-low-high profile (high-level flight with 1,000 nautical miles low-level followed by high-level cruise to recovery) fully loaded with conventional weapons are as follows:[38]

B-52G 2,755 nm
B-52H 3,749 nm
B-1B 3,250 nm

Although the B-1 has a much greater payload capacity, until programmed modifications are made, it is restricted to overflying its target for bomb delivery, as compared with the B-52's current stand-off weapons capability. Table I (see page 16) depicts current bomber conventional weapon capabilities. Note the current limitations of the B-1. This conventional gravity bomb capability was the minimum required to meet the Congressional mandate for a nuclear and conventional, dual role bomber while still being able to field the B-1 within budget.

Embarking on a New Course for Bomber Employment. The Air Force has charted a new course for the bomber force that leads it toward full-scale participation in a variety of roles that, though not unpracticed, have not seen consistent training or application since the beginning of the Cold War. Conventional roles have been performed when tasked, but with little innovation from the earliest World War II uses. The US bomber force is at a major crossroads.

TABLE I

Current Bomber
Conventional Weapons Carriage Capability

General Purpose Bombs	B-52G* Int/Ext	B-52H Int/Ext	B-1B
Mk 82	27/18	27/18	84
Mk 117	27/18	27/18	
Mk 84	8/10	8/0	
Cluster Bomb Units			
CBU 52, CBU 58, CBU 71	27/18	27/24	
CBU 87 CEM	6/18	6/22	
CBU 89 GATOR	6/18	6/24	
Mk 20 ROCKEYE	0/18	24	
Special Operations			
M129 LEAFLET	18/18	18/24	
MJU-1/B	27/18	27/24	
MC-1 LD, HD CHEMICAL	0/18	0/24	
Naval Sea Mines			
Mk 36DST, Mk 62	27/18	27/24	
Mk 40DST	0/18		
Mk 41DST	8/10	8/10	
Mk 52	12/18	12/0	
Mk 55, Mk 56	8/12	8/0	
Mk 60, Mk 64, Mk 65	8/10	8/0	
Guided Munitions			
GBU 10 PAVEWAY I	0/8		
GBU 10 PAVEWAY II	0/10		
GBU 12 PAVEWAY III	0/10		
AGM 84 HARPOON	0/8		
AGM 86C CALCM		8/12	
AGM 142 HAVE NAP	0/3-4		

* All B-52Gs are programmed to retire by the end of 1994.

Source: HQ ACC/DOTW, "Bomber Conventional Weapons Carriage" table, 26 February 1993

Does the bomber have a place in future air warfare? Some would advocate no significant changes for the "strategic bomber" beyond its nuclear deterrent mission. Some believe we waste resources by not retiring the whole fleet--scarce defense dollars should be saved, or better spent on other aircraft or weapon systems. Most agree that today's bomber force capabilities are not fully optimized for the future, regardless of whether the aircraft are retained. What is the best way to go? Before trying to answer either of these questions, one should determine if the bomber actually contributes anything unique to air warfare.

CHAPTER IV

WHAT DOES "STRATEGIC" MEAN?

> ... SAC had spent forty years educating itself and the rest of the world that bombers are strategic and that meant nuclear.[39]
>
> General George L. Butler
> Former CINCSAC and First CINC US
> Strategic Command

An Objective Not a Weapon System. Before the fall of the Soviet Union, the magnitude of the nuclear threat coupled with the means available to counter it--a bomber carrying atomic (and later nuclear) weapons--changed our understanding of the meaning of strategic and tactical. Intercontinental bombers were the sole province of Strategic Air Command which General Curtis E. LeMay created to be "a strategic atomic striking force capable of attacking any target in Eurasia from bases in the United States."[40] Ever since that time many within and outside the military consider "strategic," "nuclear," and "bomber," to be synonymous. Despite the fact that "new look" years of the 1950s had all of our forces relying on nuclear weapons, what emerged with respect to air power was: strategic means nuclear and tactical means conventional.

The Air Force came around to the reality of this terminology problem in the aftermath of Desert Storm where bombers had again been used in roles other than a typical "strategic" bombing campaign using conventional weapons. As a result, the latest Air Force Manual 1-1, Basic Aerospace Doctrine of the United States Air Force, explains the actual difference in the meanings of the terms by pointing out that "strategic" implies an impact that can affect the entire war, not just a battle. It states, "Strategic attacks are defined by the objective--not by the weapon system employed, munitions used, or target location."[41] This means that the actual weapon system and role in which it

is employed are not mutually exclusive. A "strategic" B-1 can provide close air support and a "tactical" F-16 can perform a strategic attack. When thought of in the previous sense of the terms, this points to a blurring distinction between strategic and tactical air power. Air power can now fully exploit its inherent flexibility across both traditionally separate roles with a single weapon system: combat aircraft.[42]

The New World Order. Clearing up this decades-long misconception will go a long way toward removing artificial barriers on operational planning and employment.[43] The meaning of "strategic" in the "new world order" will be able to shed much of the negative "nuclear" connotations surrounding bombers as weapons of Armageddon. The change in the superpower picture demands a look for other possible applications of weapon systems designed primarily for strategic nuclear war. Air power history is clear: Bombers are not just around to deter or fight nuclear war. When a long-standing threat changes and new applications for the weapons of war emerge, then it is useful to examine these applications closely to see if they are well-founded.

CHAPTER V

VALIDATION OF AIR POWER THEORY

> Air power alone does not guarantee America's security, but I believe it best exploits the nation's greatest asset--our technical skill.[44]
>
> General Hoyt S. Vandenburg
> Air Force Chief of Staff, 1948-1953

No Air Power Without Technology. There is no air power without technology. In fact, there is no sea power without technology. Only on land can man make war without technology. Only on land, with bare hands and individual brute force, can man fight with the intent to compel another to do his will. In his quest to gain an advantage over groups, tribes, and eventually nations, man found more efficient ways to fight. The application of technology to warfare has not stopped since man's earliest conflicts. As technology eventually became integral to land, and then sea warfare, so has air power become integral to modern combined-arms warfare. But, the history of air warfare is extremely short when compared to that of land and sea warfare. When this fact is combined with the exponential advances in technology that have taken place since the airplane's development, it has produced a situation in which the terms of reference have been constantly changing.[45] Critics would argue that this simply justifies allowing technology to drive doctrine. But, this ignores air power's technological dependence. The development of air power has been an alternating race between doctrine and technology, each concurrently driving the other.[46] This is one of the primary reasons for going back to the beginning of air power. It is essential to build upon enduring concepts in a rapidly changing environment.

What Would Clausewitz Say? The emergence of technology in war is akin to the impact of the wars of the French Revolution on Clausewitz in his development

of ideas on theoretical war--war in its absolute sense. He could not have written On War beforehand because total war between nations did not exist.[47] In the same way, air power could not have been written about in an absolute sense before witnessing its application in war. And just like Clausewitz's enduring concepts, so are those of the theorists who were there from the beginning of air power.

The enduring nature of Clausewitz brings out another important point that must be remembered when reading On War, or any of the other classics: times change. These writers must be examined with this kept in mind. Since Clausewitz's time, only the means of war have changed. War in theory has not changed. He had this to say about the impact of technology on the means of war:

> The invention of gunpowder and the constant improvement of firearms are enough in themselves to show that the advance of civilization has done nothing practical to alter or deflect the impulse to destroy the enemy, which is central to the very idea of war.[48] [Emphasis added.]

The use of air power is consistent with the central idea of war.

A New Look at Some Old Guys. Those air power theorists who imagined exploiting the third dimension in warfare well before the rapid advance of technological wonders offered a chance to examine its potential unconstrained by any particular paradigm. It is important to examine the ideas of major theorists to formulate a practical, unfettered, and comprehensive view of air power.[49] The challenge is to uncover the classic concepts and enduring principles of those who first envisioned the impact of air power characteristics on the battlefield.

Douhet. Italian Major General Giulio Douhet wrote extensively about the inherent qualities, or characteristics, of airplanes and how he believed they could best be used by a military force to win a war. In the aftermath of the

bloody World War I stalemate, he saw air power as the means to go on the offensive, unhindered by defensive lines. He also saw that, although at the time relatively unchallenged from the ground, airplanes were challenged in their own element. Douhet believed that without "command of the air"--the ability to prevent the enemy from flying while retaining the ability to fly oneself--one's own forces were susceptible to defeat.[50] He maintained the best way to ensure the ability to fly oneself was to destroy the enemy's air power before it had a chance to strike.[51] With command of the air, one could protect one's own land and sea territory while subjecting the enemy to offensive attacks.[52] The bombing actions of the aerial offensive should ideally: 1) destroy the objective completely in one attack and; 2) be able to destroy any target on a given surface.[53] The character of the aerial offensive should consist of violent, uninterrupted action against the surface objectives.[54] As for the characteristics of bombers designed to conduct such aerial offensives, they should: not unnecessarily sacrifice speed for load, possess the greatest possible range, and exploit all the airspace made available to them.[55] Douhet also theorized about an ideal combat aircraft--the "battleplane"--as being suitable for aerial combat and bombing.[56] This aircraft would be much like a modern day multi-role fighter such as the F-15E Strike Eagle. However, he understood that aircraft technology was advancing rapidly and he kept his thinking unbounded. Douhet explained, "...the plane which today is the last word in technical developments may be obsolete tomorrow."[57]

Mitchell. Major General William "Billy" Mitchell is most often remembered for his relentless pursuit of an independent US air force. However, he, like Douhet, wrote about the characteristics of air power and

drew on his World War I experience as an air commander to formulate his vision. Mitchell believed air power to be a crucial element of combined action in any future war, but understood that "...any decision in war is based on what takes place ultimately on the ground."[58] Air power could best contribute to that decision by obtaining and holding military supremacy in the air.[59] The air forces would then destroy the enemy's power to make war.[60] As he stated:

> A United Air Force would provide an aeronautical striking force designed to obtain control of the air and demolish whatever hostile land or water targets might be necessary, according to the military situation.[61]

General Mitchell envisioned that the inherent characteristics of air power would put it in a position of the first force to be called on in a crisis.[62] With a particular interest in exploiting conditions on the battlefield regardless of circumstances, Mitchell believed military aviation required the greatest possible speed and payload plus the ability to fight in adverse weather and at night.[63] He foresaw inevitable improvement in air defenses and envisioned the eventual need for stand-off weapons for bombers.[64] His underlying principle for air power organization is developing capability to provide the greatest radius of action possible.[65]

Trenchard. Marshal of the Royal Air Force Sir Hugh M. Trenchard's World War I experience shaped his belief in the primacy of the strategic offensive against the enemy's heartland.[66]

> ...air attacks will be directed against any objective which will contribute effectively towards the destruction of the enemy's means of resistance and the lowering of his determination to fight....By attacking the sources from which [the] armed forces are maintained infinitely more effect is obtained.[67]

He believed the best way to determine the objectives of these attacks and pursue them was through relentless offensive action coordinated with land and

sea forces.[68] With a slightly more limited view of "command of the air" than Douhet, Trenchard sought air superiority over the region where it was needed most, the battlefield.[69]

De Seversky. In the previous chapter, the impact of nuclear weapons on bomber operations was addressed. Here, it is important to examine the theory of one who wrote from the benefit of additional air power experience, but before the existence of nuclear weapons. This is an attempt to view air power free of artificial constraints. Major Alexander P. De Seversky had a notable impact on the technical aspects of air power theory. A Russian World War I ace, protegé of General Mitchell, aeronautical engineer, emigrant to the US, and founder of Republic Aviation Corporation (maker of the P-47 Thunderbolt), De Seversky served as a special consultant to the US War Department in World War II.[70] He witnessed and helped lead the unparalleled development of military aviation that took place during that war. He pushed development of speed and range to new limits. His efforts provide a striking example of the demands of doctrine and strategy directing technological efforts. However, he saw potential for technology to create opportunities for the military, not previously envisioned. De Seversky stated:

> ... equipment and strategy are indivisible. New types of planes or armament provide tactical possibilities, and new tactics call for revision of equipment. The work of the Air Staff and of the research organization must be closely integrated. Aeronautical-research facilities must be directly related to practical experimental planning. The compilation of purely theoretical data should be combined with the boldest kind of practical development.[71]

He described range as one of the most important characteristics for military aircraft. "The striking radius of air power must be equal to the maximum dimensions of the theater of operations."[72] "Theoretically," he explained, "air power must have a striking reach around the world."[73] When the aircraft

arrived to strike, he believed that their principal objectives, such as electrical power aggregates and aviation industries, would require the greatest precision in bombing to be destroyed.[74]

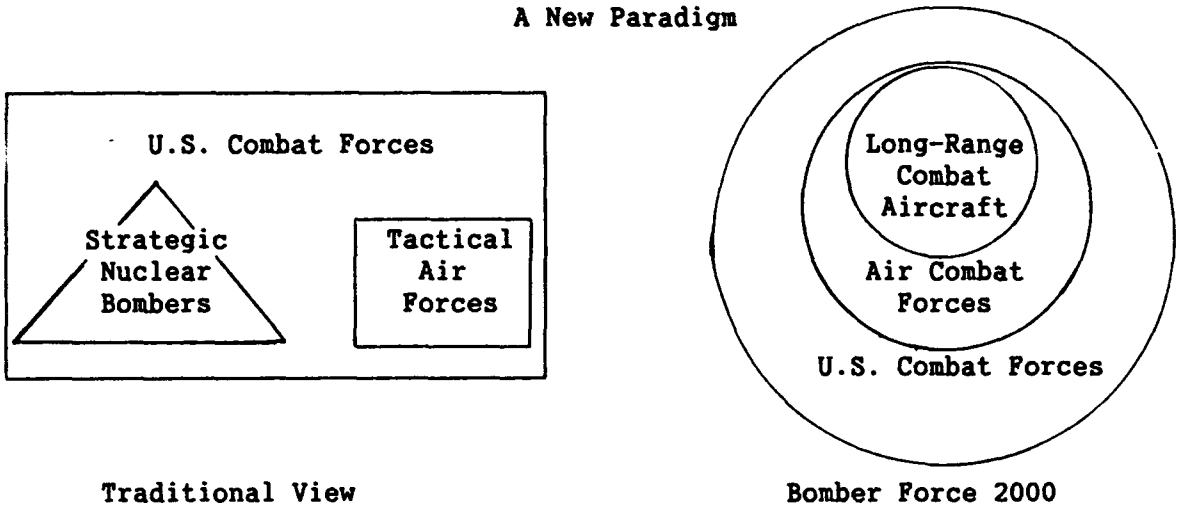
Essence of Air Power Theory. The essence of air power theory is concentrated on achieving air superiority to thereby enable air attacks to influence combat's outcome. If one removes the disjointedness from between theorists some common principles emerge: air power is inherently offensive in nature; air power is an indivisible entity; a degree of air superiority is necessary for all combat operations; indivisible air power is applied in concert with other arms to achieve victory; and technology supplies the major means to closing the gap between theory and practice. Overall, each of the early theorists envisioned almost unlimited potential in the third dimension of combat: the air. A recurring theme for each is that flexibility is the key to exploiting the combat potential of all types of airframes and employing air power.

A New Paradigm. What about exploiting the potential of air power in an age not dominated by the overwhelming threat of nuclear war? In particular, for purposes of this project, how do you take advantage of bomber aircraft if global nuclear war with the Soviet Union is no longer the principal planning and programming paradigm?[75] The answer to these questions involves viewing both air power, in general, and bombers, specifically, in light of their theoretical potential. The combination of aircraft and weapon capabilities, and the strategic environment have created a situation in which potential air power application is approaching theoretical dimensions. Yet, to think of bombers as "strategic nuclear" weapons only is to deny the existence of their inherent characteristics. Theory and history would have us look at bombers as

"long-range combat aircraft." This is the new, more robust, paradigm (see Figure 1). It could then be argued that a better designation for bombers is "A" for "attack." For example, the A-1B Lancer, A-52H Stratofortress, A-2A, etc. would require one to think in much-expanded terms of theater air power.

FIGURE 1

A New Paradigm



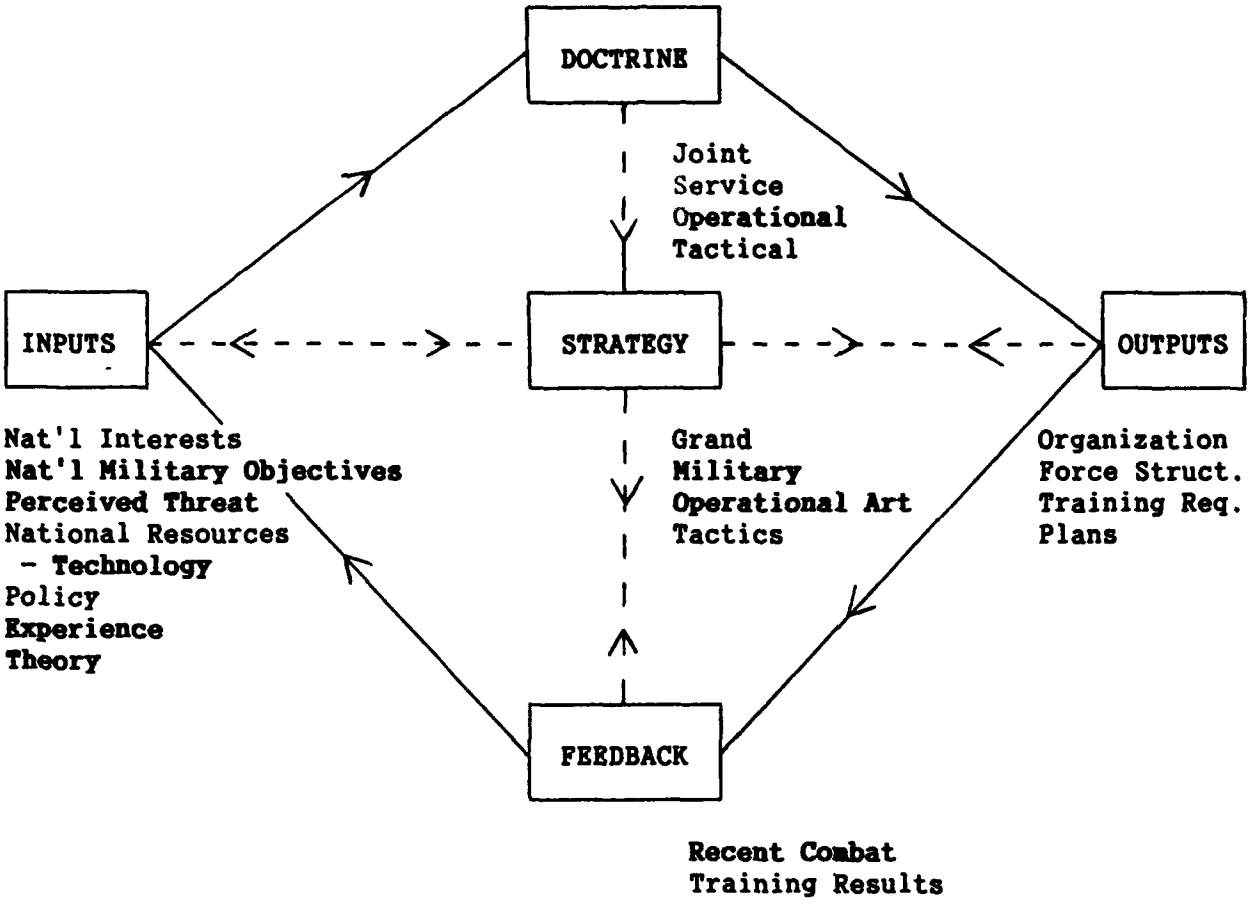
Traditional View

Bomber Force 2000

Consider Figure 2. Although this paper is not directed at a formal doctrine change, the illustration depicts how various factors interact to produce doctrine and strategy at all levels of command. Items of note for this paper are highlighted. Experience, recent combat, and theory are the elements of "inputs" and "feedback" discussed up to this point. In the next chapter, further impetus for change will be presented by providing the remaining "inputs" of: national military strategy, perceived threat, and technology. Future operational concepts will then be formulated to provide the basis for strategy and operational level elements of the "doctrine" and "strategy" portions of the figure.

FIGURE 2

Doctrine and Strategy Loop



Source: Jeffrey D. Burum, "Doctrine and Strategy," Judy M. Graffis and Michael M. Whyte, eds., Readings in Military Art and Science (Dubuque, IA: Kendall/Hunt, 1992), pp. 119-126.

CHAPTER VI

FUTURE OPERATIONAL CONCEPTS

> We shall glance at the war of the past long enough to retrace its essential features; we shall ask of the present what it is preparing for the future; and, finally, we shall try to decide what modifications will be made in the character of war by the causes at work today in order to point out their inevitable consequences.[76]
>
> Major General Giulio Douhet

The first B-2 was delivered to Air Combat Command (ACC) on 17 December 1993--ninety years to the day after the Wright Brothers first controlled powered flight. When the B-2 becomes operational, it will possess nuclear delivery capability which continues to be important. However, it will also integrate present and programmed conventional weapons capability. This represents a significant change in thinking since World War II bomber production. Result: A true long-range combat aircraft in design and operational capability.

Characteristics of Future Conflicts. Several factors point to the need for such an aircraft. Writing before the end of the Cold War the former CINCSAC, General John T. Chain, Jr., identified what he saw then:[77]

1. A requirement for prompt worldwide power projection.
2. The need for long-range strike capability.
3. Theater commanders' need for massive firepower.
4. The need to reduce conventional force disparities with the Soviet Bloc.
5. An added requirement for conventional forces following negotiated reductions in nuclear weapons.
6. Reduced defense budgets place a premium on versatile weapon systems.

General Chain's ideas are of continuing relevance today. In the 1993 "bottom-up review" of the armed forces, Secretary of Defense Les Aspin described the dangers that threaten US interests in the post-Cold War era:[78]

1. Spread of nuclear, biological, and chemical weapons.
2. Aggression by major regional powers or ethnic and religious conflict.
3. Potential failure of democratic reform in the former Soviet Union and elsewhere.
4. Potential failure to build a strong and growing US economy.

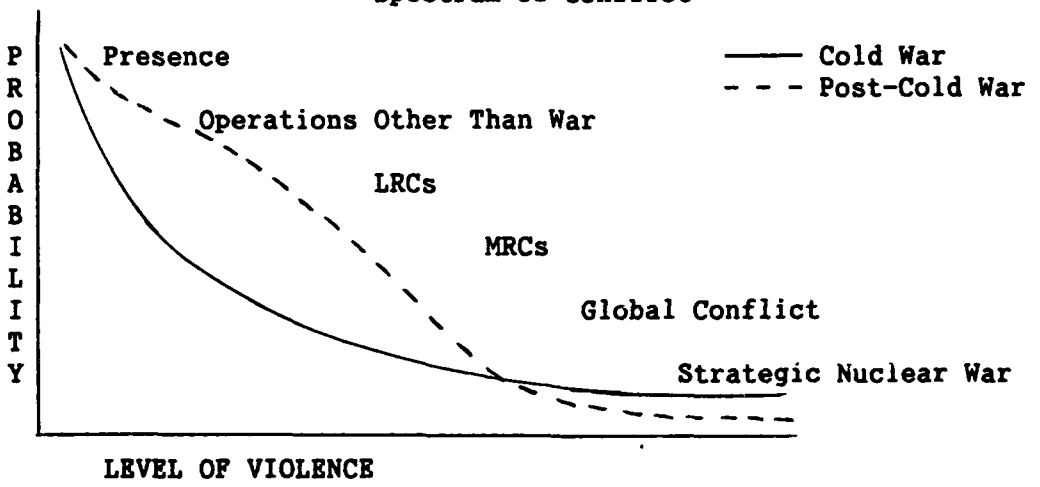
The report placed a premium on being able to project power into any region where our interests are threatened. Considering all the things discussed up to this point, the following planning assumptions about characteristics of future conflicts can be made:[79]

1. Few US forces will be deployed in the region at the outbreak of hostilities.
2. Potential allies may be badly outnumbered.
3. The adversary will possess large ground forces, including sizable armor formations, and possibly weapons of mass destruction.
4. The need to minimize the risk of heavy US casualties.

There will be other new threats as well. The proliferation of high technology and weapons of mass destruction increases elements of risk and lethality in the lower intensity range of conflicts (see Figure 3).

FIGURE 3

Spectrum of Conflict

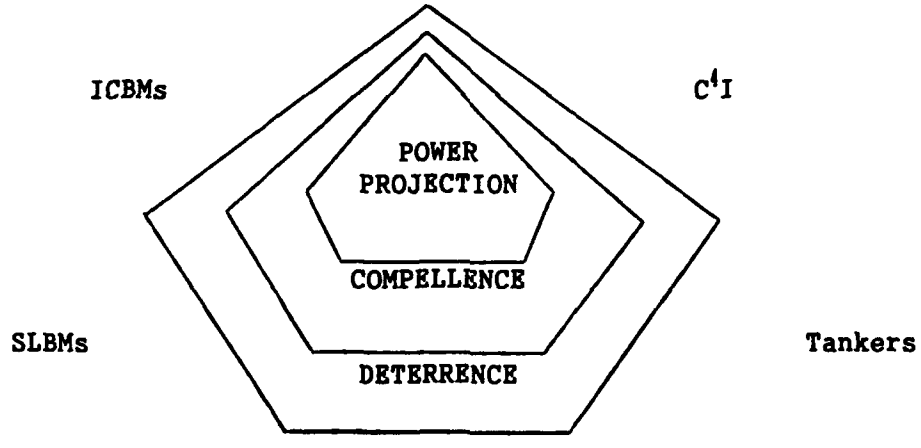


Deterrence remains the number one priority for all US forces. When used in nuclear and conventional taskings, the bomber force enhances deterrence (see Figure 4). The probability of nuclear war has been significantly reduced, but conventional war will not be eliminated. More emphasis must then be place on forces capable across the spectrum of conflict: still able to increase a nuclear

posture, but also able to respond quickly and decisively in a conventional scenario. Expansion into conventional operations is entirely appropriate since more potential adversaries with more diverse capabilities have to be taken into account. We must be capable of providing a capable, comparable military threat. Deterrent effects of nuclear weapons have proven only to apply against adversaries comparably equipped with nuclear weapons.[80] Bombers, dual-tasked for nuclear and conventional missions, are the lynch-pin in a new "Global Reach, Global Power Pentad" (see Figure 4).

FIGURE 4

Role of Bombers
in
Global Reach, Global Power
"Pentad"



SPECTRUM OF CONFLICT

Adapted from: General George L. Butler, "Disestablishing SAC," Air Power History, Fall 1993, p. 9. AF Mag Aug 91; William S. Higgins, "Deterrence After the Cold War: Conventional Arms and the Prevention of War," Airpower Journal, Summer 1993, pp. 49-57.

The globe continues to shrink. Access to instantaneous global communications is increasing daily. The entire earth is accessible within hours

by air, with the future holding a space plane that would make travel anywhere in world and back possible within the same day. The compression of time and space increases the potential for a "short-warning" conflict[81] possessing a very fluid battlefield within the combat theater of operations. A former director of US Navy C^{4}I programs, Admiral Jerry O. Tuttle, described the acceleration of global time compression:

> An unimaginable amount of information will flow over glass and fiber optics, first over our national grid followed by an international grid....This information will flow over photonic superhighways at teraflop rates, that's 10^{12}, before the end of the century; at rates of 1000 teraflops by 2005 and at a thousand times greater rate by 2010, that is 10^{18}. Those are not just zeros, they are profound landmarks in technology that will have unimaginable major impacts on our every endeavor and enterprise.[82]

It will be increasingly difficult for future commanders to keep their decision cycle shorter than that of the enemy's. To stay inside the "observe-orient-decision-action, or OODA, loop" of the enemy will require rapid, sound decisions and potentially require a correspondingly rapid deployment of forces. A future opponent, given to study the lessons of Desert Storm, will not allow a similar amount of time for the US to move decisive force into a combat theater. The next conflict could require initial combat within hours followed by the forced entry of necessary follow-on forces. This scenario would also bring with it a rapid attrition of resources.

Across the Spectrum of Conflict. Bombers can be used across the entire spectrum of conflict in support of US interests.[83] The conflict does not have to be a major regional conflict (MRC). Bombers can project power quickly and establish a presence more rapidly than most other military forces, excepting the naval forces that might already be on station. The B-52 can be used to effectively counter threats in the lower range of conflict while the B-1 and B-2 can be used counter increasing threat levels. On the high end of the spectrum, two

simultaneous MRCs would require essentially all available air combat forces, both active and reserve.[84] As a case of coercive diplomacy, the combined use of military power and diplomacy to induce an opponent to alter or change behavior, the El Dorado Canyon raid on Libya is a good example of the use of long-range combat aircraft, F-111s, to achieve national goals.[85] To look at it another way, the raid in Libya could have been handled by two B-2s, six KC-135 tankers--a more effective force with less risk to aircrews.[86]

The US has often used land-based aircraft extensively to resolve incidents in the lower end of the spectrum. In a study on the use of armed forces to resolve incidents, it was concluded that, "Positive outcomes were particularly frequent when land-based combat aircraft were involved in an incident."[87] The use of a small number of bombers for providing presence, shows-of-force, and demonstrations, can avoid adverse signals sent by an increased deployability posture required by a larger armed force.

Impact of Technology. Recent technological innovations hold particular promise for military aircraft, especially for bombers. Advances in stealth technology, precision-guided munitions (PGMs), and radar permit modification of existing platforms, production of advanced platforms, and improved weapon lethality. Stealth has been described as the greatest advance since radar and the atomic bomb.[88] The development of stealth aircraft, such as the F-117 and now the B-2, provide unprecedented ability to penetrate integrated air defenses. The capability this provides in the first critical hours of a conflict, before air defenses can be neutralized, is evolutionary.

PGMs are another force multiplier that have proven capability to offer advantages to any combat aircraft. In the past, fighters, because of speed and maneuverability, have held accuracy and survivability advantages over bombers

when employed in a ground attack role.[89] With PGMs, these advantages are available to bombers. In addition, the bomber retains the advantage of carrying several times the payload of the smaller fighter and the ability to loiter in an area for an extended period while selecting multiple targets.[90] In an era of the smallest bomber force since the 1930's, they enable more practical employment of limited assets. Similar to the short-range attack missile (SRAM) employment concept of neutralizing high threat areas before arrival, PGMs can provide a tailored, on-board, strike package for suppression of enemy air defenses (SEAD) to open the way for second echelon forces.[91] Existing penetration tactics can be modified to meet tougher threats by allowing bombers the ability to stay beyond lethal engagement zones.

Advances in munitions lethality and accuracy are improving hard-target kill capability of PGMs. Modular warheads will soon provide more flexibility to decisively engage different types of targets without having to change the basic munitions casing. PGMs also help to meet the continuing constraint to limit collateral damage and minimize casualties. Additionally, they allow a smaller number of bombers to counter an increasing number of potential targets. In a 1992 Air Force study, the then-existing force of B-52s and B-1s was projected under wartime conditions to be able to destroy approximately 300 of 1,250+ time-critical target elements in the first five days of a conflict.[92] By 2001, the B-52/ B-1/ B-2 force, equipped with the programmed complement of PGMs, will be capable of destroying all of the 1,250+ targets.[93] Failure to pursue PGMs for bombers will only contribute to their non-use in a conventional role and eventual decay in overall utility.

The advances in radar technology are improving bomber survivability by reducing and channelizing emissions. Synthetic aperture radar (SAR) and low

probability of intercept (LPI) radar provide increased accuracy and are re-programmable for future growth potential. The LPI radar on the B-2 provides the ability to counter mobile theater ballistic missile threats by identifying and attacking mobile targets.

Realistic Dual Mission Capability. Critics of bombers cite it as a single mission capable aircraft that can only be employed in limited scenarios.[94] This is true when considering nuclear deterrence. It is also a fair criticism in a conventional scenario when bombers deliver only gravity weapons. If no advanced conventional weapons are acquired for bombers, then this criticism is entirely correct, especially when considering the increasing lethality of defenses. Therefore, diversification of weapons the bomber platform can employ will allow it to be more flexible for either nuclear or conventional roles.[95]

Dual mission capability can be realistically maintained. But, it does present some problems related with the nuclear role. Nuclear surety would be the greatest area of concern. Nuclear procedures proficiency could suffer if training is not regular. However, most of the concerns are from a nuclear-dominated mind set. Air Force F-111 units in England performed a dual tasking for years. Flight training would not suffer since there are only slight differences in tactical delivery techniques of both nuclear and conventional weapons. Command and control procedures for directing forces in a nuclear scenario are where there are significant differences. Training in nuclear command and control procedures would have to continue in dual tasked units. Additionally, transition of selected bomber units to the nuclear role could be tied to a particular force readiness posture, depending on threat warning indications. If directed by US Strategic Command, this process would allow crews and maintenance to refocus entirely on a nuclear tasking. Single mission

conventional tasking also alleviates any problems of this nature. Single mission tasking will accelerate beginning in 1994 when the Air Force starts transferring selected B-52H and B-1 units to the Air National Guard and Air Force Reserve for conventional-only operations. The B-1 will eventually be tasked solely as a conventional bomber.

Douhet's assertion that a "battleplane" would be even better if its characteristics were "elastic" is appropriate for today's thinking.[96] As this paper has shown, the bomber is a versatile aircraft. Its "elasticity" resides in a large and varied payload capability that can be employed over great distances. Even more pragmatic, is the fiscal argument. The reality of budget limitations demands full utilization of all weapon systems.

Command of the Air. In addition to nuclear and conventional strategic attack, bombers are capable of all aerospace control and force application roles--interdiction, close air support, and counterair. This need is stated explicitly in the B-2 mission statement. It goes beyond the recognized need for strategic attack and includes other counterforce and counterair target capabilities.[97] As Air Force Chief of Staff, General Merrill A. McPeak declared, "The era of disintegrated air power is over."[98] The availability of indivisible air power provides the theater CINC with more effective air combat power. For the theater CINC, the compression of time and space is creating the demand for simultaneous and/or concurrent application of air power in all roles. This means planning for overlap or merging of air campaign phases even greater than what occurred in Desert Storm.

The need to fight quickly and effectively, in the temporary absence of other forces, requires any combat aircraft to possess a degree of active and passive defense capability. Air power must still be able to operate in the face

of an enemy air threat. This can be thought of as "indirect", "localized," or "temporary" air superiority, similar to Trenchard's ideas (See page 21). This is not mutually exclusive of, nor does it negate, the need for overall air superiority. Efforts will still be directed toward achieving air superiority in the theater. Once it is achieved then the operations tempo can be increased and counter air efforts redirected to perform other roles as required.

B-1, B-2, B-52H Capabilities. The program for the future is aggressive, and at the same time overdue. Most important, the new generation of conventional weapons are compatible with other US combat aircraft. While the USAF and Navy procured weapons in this way for years for fighter and attack aircraft, the bomber has always been "different." Not having compatible delivery systems has limited the inherent flexibility of all our combat aircraft. This will no longer be the case. The right aircraft and weapon type can be selected for the desired objective. This makes fiscal and operational sense, especially when considering the size of the bomber force at the turn of the century. The programmed force structure calls for 95 B-52Hs, 96 B-1Bs, and 20 B-2s.[99]

Concerning specific bombers, the B-52H is commencing the heavy stores adapter beam (HSAB) modification now, as the B-52Gs retire by the end of 1994. This modification will allow the B-52H to carry the Air Force's heaviest munitions on its external racks. (See Table II for bomber specific weapon capability.) The B-52H can be employed directly against the lowest threat environment, use shorter range stand off munitions for a medium intensity threat, and employ the conventional cruise missile from well outside the most heavily defended areas. Global positioning system (GPS) integration enhances B-52H survivability by allowing the bomber to run radar silent for most of its mission. The B-52H has the greatest unrefueled range of any US bomber. It will continue

to be limited for dispersal or forward deployment by the requirement for a 200' wide runway.

The B-1 has the greatest speed and payload capability of the US bomber fleet. When the 1760 Data Bus modification is complete, the B-1 will be compatible with all the new PGMs. Its high subsonic cruise speed (.95 Mach maximum at low level) makes the B-1 ideal for integration with fighter and other attack aircraft in composite strike forces. The B-1, equipped with stand off munitions, can be used against any threat.

The B-2 will bring fourth generation stealth technology to the battlefield; incorporating radar, thermal, acoustic, and visual signature reduction.[100] It can be used in either direct or stand-off attack roles in the face of any level of threat. The B-2's survivability, precision weapons, and advanced radar will make it the most effective bomber against a relocatable target threat.

All the bombers are capable of world-wide communications and can perform limited mission planning and receive mission changes while airborne. While the B-52H will supply the strongest anti-ship capability by employment of Harpoon missiles, all the bombers will be able to deliver mines in support of maritime operations worldwide.

Integration of Combat Power. The application of indivisible air power in concert with other forces means integration of combat power. Consistent with theory and proven by history, integration with land and sea power is essential to achieve maximum combat power. Operational art demands synchronization--the arrangement of land, air, and sea operational forces in time, space, and purpose to produce maximum relative combat power at the decisive point.[101] The purpose is to direct one's best efforts at where the enemy is most vulnerable. Decisive points and center(s) of gravity are derived from the selected strategy and operational

TABLE II

Programmed Bomber
Conventional Weapons Carriage Capability

General Purpose Bombs	B-52H Int/Ext	B-52H* Int/Ext	B-1B Int	B-2 Int
Mk 82	27/18-24	27/18	84	80
Mk 84	8/10-0	8/10		16
Mk 117	27/18-24	27/18		36
Cluster Bomb Units				
CBU 52, CBU 58, CBU 71	27/18-24	27/18		
CBU 87 CEM	6/18-22	6/18	15	36
CBU 89 GATOR	6/18-24	6/18	15	36
CBU 97 SFW			15	36
Mk 20 ROCKEYE	0/18-24	0/18		
Special Operations				
M129 LEAFLET	18/18-24	18/18		
MJU-1/B	27/18-24	27/18		
MC-1 LD, HD CHEMICAL	0/18-24	0/18		
Naval Sea Mines				
Mk 36DST	27/18-24	27/18		
Mk 40DST	0/18-0	0/18		
Mk 41DST	8/10-0	8/10		
Mk 52	12/18-0	12/18		
Mk 55, Mk 56	8/12-0	8/12		
Mk 60	8/10-0	8/10		
Mk 62	27/18-24	27/18	84	80
Mk 63	0/18-0	0/18		
Mk 64, Mk 65	8/10-0	0/10		
Guided Munitions				
GBU-10 PAVEWAY I	0/8-0	0/8		
GBU-10, GBU-12 PAVEWAY II,III	0/10-0	0/10		
AGM 84 HARPOON		0/8		
AGM 86C CALCM	0/12	8/0		
AGM 142A HAVE NAP		0/3-4		
JDAM I, JDAM III		0/10-12	24	16
JSOW			12	8
TSSAM		**	**	**

* With Heavy Stores Adapter Beam (HSAB) and 1760 Data Bus. ** Classified.

Source: HQ ACC/DOTW, "Bomber Conventional Weapons Carriage," table, 26 Feb 1993.

plan. The search is then for the most vulnerable points and nodes within the decisive points and center(s) of gravity. With the help of intelligence and knowledge of the enemy's doctrine, specific targets can then be identified.

For those targets selected for air attack, the appropriate combat aircraft is then selected. Long-range combat aircraft, bombers, would be utilized to go where other forces cannot, loiter for extended periods, and/or strike targets requiring massive firepower. Bombers then enhance combat power when completely integrated as a weapon platform utilized on the basis of its unique capabilities: range, flexibility, precision, and lethality.

Training for the Future. Full integration demands full participation in interservice, joint, and combined training. Bombers have often participated in past conventional air power exercises, such as Red Flag and Bright Star, as a distinctly separate element. Bombers showed up when directed and at times and places that would not "detract" from the overall conduct of the exercise. There might be fighter escort or a composite strike force package to exercise with, but only if it was convenient for TAC. Fighter intercept exercises with air defense units and Busy Observer missions with the Navy used bombers in a similar "loner" fashion. However, this is not necessarily inconsistent with bomber operational employment concepts.

Future bomber operations will have to be preceded by a different training philosophy. The "loner" scheme is not consistent with training for future conflicts. Efforts for change are underway now. They started with activation of Air Combat Command (ACC) in June 1992. The conventional bomber mission will be handled better by a command organized for the employment of general-purpose forces.[102] In ACC, bombers are being integrated into planning, exercising, and employment of forces. Team Spirit 93 saw bombers

actually deploy to Korea. ACC "Global Power" missions are sending bombers on simulated extended range and endurance conventional strikes.

Problems that Don't Seem to Go Away. Problems that cannot be eliminated with new weapons and training, however, still must be addressed. Survivability becomes more of an issue given the limited numbers of bombers left in the inventory. Will commanders risk the most expensive assets if they have concern for their survivability? The use of older B-52s will not cause undue concern, since our political and military leadership have witnessed their use. B-1s and B-2s will certainly be another story. The Air Force has gone to great lengths to make sure the newer technology, such as LPI radar and stealth, works as advertised. Confidence can be drawn from the fact PGMs worked as advertised in the Gulf War. As always, actual combat will be the real test.

Although B-1s and B-2s could be used effectively in lower intensity conflicts, the level of technological and political risk associated with the B-52 is lower.[103] However, history shows the weapon system used is the one believed best for the job as weighed against the risks of the situation. The SR-71, the most expensive operational aircraft of its time, was routinely flown into high threat areas precisely because of its technological advantages.[104]

There will be a challenge to sustained operations if faced with more than one MRC, given the small fleet of bombers. Operations from the US will be long and present a significant aircrew fatigue problem. B-52 crews can be augmented with an extra pilot and navigator. B-1s could also augment in this manner, but do not currently train this way. The lack of ejection seats for the extra crewmembers poses an unacceptable peacetime risk in the in the B-1's

500+ knots airspeed regime during low level flight. For its part, the B-2 has an extra crewmember position that can be used for long endurance flights. As previously mentioned, ACC has undertaken the "Global Power" training program with specific long endurance concerns in mind. If forward basing is available, it has the potential to reduce problems of this nature by shortening mission durations.

Use to Theater CINCs. Should deterrence fail and conflict occur, US strategy envisions that combat operations will unfold in four phases: 1) Halt the invasion. 2) Build up combat power in theater while reducing the enemy's. 3) Decisively defeat the enemy. 4) Provide post-war stability.[105] Future operational concepts for long-range combat aviation will have to take characteristics of probable conflicts into account. Once the decision is made to use force, a theater commander who recognizes the flexible and indivisible nature of air power will be capable of enhancing his selected strategy with bombers. Critical targets within all levels of threat can be put at risk. The bomber's range and firepower are of increasing importance for a continental force. According to ACC Commander, General John M. Loh, "most of our combat power--in fact, ninety percent of it--will be based in the United States, yet [it] must be immediately responsive to all of the theater commanders' needs."[106] During the four phases of conflict, bombers can be integrated into the highlighted missions. Their roles will be:

Phase 1: Bombers, first and foremost, provide the theater CINC with added ability to seize the initiative in rapidly changing circumstances over various levels of conflict. The bomber force of long-range combat aircraft are fully "dressed" for a "come as you are" war. Time-critical targets, such as fixed transportation nodes could be destroyed early in a "choke-point" war

of rapidly advance forces.[107] The B-2 will have exceptional ability against key targets, early before enemy defenses are suppressed.[108]

Phase 2: The theater CINC tailors an adaptive joint force package of air, land, and sea forces to move forward and meet the contingency.[109] Bombers maintain the initiative in round-the-clock operations and by exploiting the adverse fighting conditions of night and/or weather. JFACC directs indivisible application of all air power assets. With the addition of forward basing, tanker aircraft will become increasingly available for other combat aircraft in the deployment phase. Tanker availability will be critical in two nearly simultaneous MRCs.

Phase 3: Bombers employ maximum firepower in sustained operations in all necessary force application roles as part of a combined-arms team. Bombers continue to exploit adverse conditions and various/multiple axes of attack. In the event of a simultaneous conflict, some bombers could be switched to operations in the new theater to counter that threat.

Phase 4: Reconstitution of other bomber forces after sustaining forces are in place ensures deterrence and the ability to respond elsewhere.

The bomber's characteristics--flexible, offensive, responsive, range, firepower, versatile--provide effective operational capability to a theater CINC to shape the battlefield of the future. The bomber force increases the number of "tools" in the CINC's "tool box." The commander can then determine what needs to be done, examines his capabilities, and uses those "tools" that will get the job done.

CHAPTER VII

CONCLUSIONS

Bombers are long-range combat aircraft with inherent flexibility to perform several attack roles employing either nuclear or conventional weapons. The new emphasis on advanced conventional weapons is consistent with air power theory, aircraft and crew capabilities, as well as the strategic environment. Air power theory, current Air Force doctrine, emerging technologies, and the new global strategic situation are combining to produce a new paradigm for the US bomber force. When thought of as long-range combat aircraft, bombers can provide theater CINCs with a unique ability to tailor and employ their forces for a variety of operations capable of achieving strategic, operational, and tactical objectives across the spectrum of conflict.

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